AMENDMENTS TO THE SPECIFICATION:

Page 1, amend paragraph [0002] as:

[0002] A wavelength division multiplexer (WDM) is used to merge lights with different wavelengths for transmission on the same ~~fiber optic~~ optical fiber, or split lights with different wavelengths for transmission on separate ~~fiber-optics~~ optical fibers. The device is widely used in fiber optic communication networks, bi-directional transmission and CATV systems.

Page 1, amend paragraph [0003] as:

[0003] Figure 1 of the attached drawings shows a thin-film filter WDM, comprising ~~fiber optics~~ optical fibers 111, 112, 113, a dual-core collimator 121, a single-core collimator 122, and a thin-film filter 130. The thin-film filter WDM has the advantages of good optical characteristics, and high stability. However, it also has the disadvantages of requiring active alignment for assembly, and using expensive components, such as collimators.

Page 1, amend paragraph [0004] as:

[0004] Figure 2 shows a fused-type WDM manufactured with the fused biconic taper technology to fuse the ~~fiber optics~~ optical fibers 211, 212, 213 to form a WDM 220. The fused-type WDM has a low production cost. However, it also has the disadvantages of having poor optical characteristics, such as narrow pass bandwidth, and low wavelength isolation. It is important to find a method to manufacture a WDM with good optical characteristics at a low production cost.

Page 2, amend paragraph [0005] as:

[0005] The objective of the present invention is to provide a WDM that is good in automatic alignment, feasible in passive alignment, small in size, and low in production cost. To achieve the foregoing objective, the present invention utilizes the special crystal lattice structure of the silicon wafer, uses a micro lithography and etching process to manufacture specific grooves, and moves the ~~fiber-optics~~ optical fibers, lenses, and thin-films into the grooves under the passive alignment conditions to manufacture a WDM for both multiplexing and demultiplexing lights.

Page 2, amend paragraph [0007] as:

[0007] The silicon optic based WDM of the present invention comprises a silicon substrate with grooves, an input ~~fiber-optic~~ optical fiber of incoming port with its front lens, ~~a fiber-optic~~ an optical fiber of pass port with its front lens, ~~a fiber-optic~~ an optical fiber of reflect port with its front lens, and a thin-film filter. The ~~fiber-optics~~ optical fibers, lenses, and the thin-film filter are inserted into grooves to complete the fiber-to-fiber alignment.

Page 2, amend paragraph [0008] as:

[0008] The WDM of the present invention can act as a wavelength demultiplexer, which is to input two lights with different wavelengths through the same ~~fiber-optic~~ optical fiber, and use the lenses and the filter to split the two lights for outputting through different ~~fiber-optics~~ optical fibers. By reversing the foregoing process, the present invention can also act as a wavelength multiplexer to input two lights through different

~~fiber optics~~ optical fibers, and use the lenses and filter to deflect and reflect so that both lights can be outputted through the same ~~fiber optic~~ optical fiber.

Pages 3-4, amend paragraph [0019] as:

[0019] Figure 3 shows a first embodiment of a silicon optic based WDM of the present invention. The first embodiment uses a single thin-film filter. The embodiment comprises an input ~~fiber optic~~ optical fiber 311 at an incoming port with its front lens 321, an output ~~fiber optic~~ optical fiber 313 at a pass port with its front lens 322, an output ~~fiber optic~~ optical fiber 312 at a reflect port with its front lens 321, a thin-film filter 330 and a silicon substrate 340. The operational mechanism is to input a first light with wavelength $\lambda 1$ and a second light with wavelength $\lambda 2$ from the same input ~~fiber optic~~ optical fiber 311, then to focus the lights with the lens 321 to form a parallel ray for transmission through air. When the parallel ray [[reach]] reaches thin-film 330, the first light with wavelength $\lambda 1$ penetrates the thin-film filter 330, reaches lens 322, and focuses into the ~~fiber optic~~ optical fiber 313 for transmission. On the other hand, the second light with wavelength $\lambda 2$ is reflected back to lens 321, and transmitted through ~~fiber optic~~ optical fiber 312. Therefore, the first light and the second light that are originally transmitted in the same ~~fiber optic~~ optical fiber 311, are split and transmitted in separate ~~fiber optics 312and~~ optical fibers 312 and 313, respectively. This operation accomplishes wavelength demultiplexing.

Page 4, amend paragraph [0020] as:

[0020] The wavelength multiplexing function is achieved by reversing the foregoing

operation of the present invention. A first light λ1 and a second light λ2 are input from ~~fiber-optic~~ optical fibers 313 and 312, respectively. By the combination of the lens 322, lens 321, and the thin-film filter 330, the first light is deflected and the second light is reflected into a same ~~fiber-optic~~ optical fiber 311 for transmission.

Pages 4-5, amend paragraph [0021] as:

[0021] Figure 4 shows a second embodiment of a silicon optic based WDM of the present invention. The second embodiment uses two thin-film filters. The embodiment comprises an input ~~fiber-optic~~ optical fiber 411 at an incoming port with its front lens 421, an output ~~fiber-optic~~ optical fiber 412 at a pass port with its front lens 422, an output ~~fiber-optic~~ optical fiber 413 at a reflect port with its front lens 423, a first thin-film filter 431, a second thin-film filter 432, and a silicon substrate 440. The operational mechanism is to input a first light with wavelength λ1 and a second light with wavelength λ2 from the same input ~~fiber-optic~~ optical fiber 411, then to focus the lights with the lens 421 to form a parallel ray for transmission to reach the first thin-film 431, the first light with wavelength λ1 penetrates the first thin-film filter 431, reaches lens 422, and focuses into the ~~fiber-optic~~ optical fiber 412 for transmission. On the other hand, the second light with wavelength λ2 is reflected back to the second thin-film filter 432, then reflected by the second thin-film filter 432 to the lens 423 and transmitted through ~~fiber-optic~~ optical fiber 413. Therefore, the first light and the second light that are originally transmitted in the same ~~fiber-optic~~ optical fiber 411, are split and transmitted in separate ~~fiber-optics 412and~~ optical fibers 412 and 413, respectively. This operation accomplishes wavelength demultiplexing.

Page 5, amend paragraph [0022] as:

[0022] The wavelength multiplexing function is achieved by reversing the foregoing operation of the embodiment. A first light λ1 and a second light λ2 are input from ~~fiber optics~~ optical fibers 412 and 413, respectively. By the combination of the first thin-film filter 431, and the second thin-film filter 432, the first light is deflected and the second light is reflected into a same ~~fiber-optic~~ optical fiber 411 for transmission.

Pages 5-6, amend paragraph [0023] as:

[0023] Figure 5 shows a third embodiment of a silicon optic based WDM of the present invention. The third embodiment uses two thin-film filters. The embodiment comprises an input ~~fiber-optic~~ optical fiber 511 at an incoming port with its front lens 521, an output ~~fiber-optic~~ optical fiber 512 at a pass port with its front lens 522, an output ~~fiber-optic~~ optical fiber 513 at a reflect port with its front lens 523, a first thin-film filter 531, a second thin-film filter 532, and a silicon substrate 540. The operational mechanism is to input a first light with wavelength λ1 and a second light with wavelength λ2 from the same input ~~fiber-optic~~ optical fiber 511, then to focus the lights with the lens 521 to form a parallel ray for transmission through the air to reach the first thin-film 531, the first light with wavelength λ1 penetrates the first thin-film filter 531, reaches lens 522, and focuses into the ~~fiber-optic~~ optical fiber 512 for transmission. On the other hand, the second light with wavelength λ2 is reflected back to the second thin-film filter 532, then reflected by the second thin-film filter 532 to the lens 523 and transmitted through ~~fiber optic~~ optical fiber 513. Therefore, the first light and the second light that are originally transmitted in the same ~~fiber-optic~~ optical fiber 511, are split and transmitted in separate

~~fiber optics 512and~~ optical fibers 512 and 513, respectively. This operation accomplishes wavelength demultiplexing.

Page 6, amend paragraph [0024] as:

[0024] The wavelength multiplexing function is achieved by reversing the foregoing operation of the embodiment. A first light λ1 and a second light λ2 are input from ~~fiber optics~~ optical fibers 512 and 513, respectively. By the combination of the first thin-film filter 531, and the second thin-film filter 532, the first light is deflected and the second light is reflected into a same ~~fiber optic~~ optical fiber 511 for transmission.

Page 6, amend paragraph [0025] as:

[0025] The present invention is able to multiplex or demultiplex more than two different wavelengths based on the same structure. Figure 6 shows a fourth embodiment of a silicon optic based WDM of the present invention. The fourth embodiment uses a plurality of thin-film filters. The embodiment comprises an input ~~fiber optic~~ optical fiber 611 at an incoming port with its front lens 621, output ~~fiber optics~~ optical fibers 612, 613, 614, 615 at a pass port with their front lenses 622, 623, 624, 625, a first thin-film filter 631, a second thin-film filter 632, a third thin-film filter 633, a fourth thin-film filter 634, and a silicon substrate 640.

Pages 6-7, amend paragraph [0026] as:

[0026] The operational mechanism is to input a first light with wavelength λ1, a second light with wavelength λ2, a third light with wavelength λ3, and a fourth light with wavelength λ4 from the same input ~~fiber optic~~ optical fiber 611, then to focus the lights

with the lens 621 to form a parallel ray for transmission through the air to reach the first thin-film 631, the first light with wavelength λ1 penetrates the first thin-film filter 631, reaches lens 622, and focuses into the ~~fiber optic~~ optical fiber 612 for transmission. On the other hand, the other lights with wavelength λ2, λ3, λ4 are reflected back to the second thin-film filter 632. The second light λ2 is reflected to the lens 623, and focuses for transmission in ~~fiber optic~~ optical fiber 613. The third light λ3 and the fourth light λ4 penetrate the second thin-film filter 632 to reach the third thin-film 633. The third light λ3 is reflected by the third thin-film 633 to enter lens 624, and focus into ~~fiber optic~~ optical fiber 614 for transmission. Then, the fourth light λ4 penetrates the third thin-film filter 633 and reaches the fourth thin-film filter 634. The fourth light λ4 is reflected by the fourth thin-film filter 634 to the lens 625 and transmitted through ~~fiber optic~~ optical fiber 615. Therefore, the four lights that are originally transmitted in the same ~~fiber optic~~ optical fiber 611, are split and transmitted in separate ~~fiber optics~~ optical fibers 612, 613, 614, and 615, respectively. This operation accomplishes wavelength demultiplexing.

Page 7, amend paragraph [0027] as:

[0027] The wavelength multiplexing function is achieved by reversing the foregoing operation of the embodiment. A first light λ1, a second light λ2, a third light λ3, and a fourth light λ4 are input from ~~fiber optics~~ optical fibers 612, 613, 614, 165, respectively. By the combination of the first thin-film filter 631, the second thin-film filter 632, the third thin-film filter 633, and the fourth thin-film filter 634, the lights are deflected and reflected into a same ~~fiber optic~~ optical fiber 611 for transmission.

Page 7, amend paragraph [0028] as:

[0028] Furthermore, the silicon substrate of the foregoing embodiments is a silicon substrate comprising grooves, made by a micro lithography and etching process utilizing the special crystal lattice structure of a silicon wafer. Figure 7 shows a diagram of the silicon substrate. The grooves 711, 712, 713 on the silicon substrate 730 are for inserting ~~fiber-optics~~ optical fibers and lenses. The size of the grooves and the distance between grooves are controlled within the precision of ±0.5μm. On the other hand, the grooves 721, 722, made by etching or a precise dicing to form specific angles, are for inserting thin-film filters.

Page 8, amend paragraph [0030] as:

[0030] The fiber-to-fiber coupling of the embodiments of the present invention is done in various ways to reduce the fiber-to-fiber coupling loss. Figure 9 shows cross-sectional views of various couplings. Figure 9A shows that the fiber-to-fiber coupling is done by using ball lenses, cylindrical lenses, or aspheric lenses. The cross-sections are shown as 911 and 912. Figure 9B shows that a fiber-to-fiber coupling is done by lenses with gradient refraction, with cross sections 921, 922. Figure 9C shows that a fiber-to-fiber coupling is done by plano-convex lenses, with cross-sections 931, 932. Figure 9D shows that a fiber-to-fiber coupling is done by a lens fiber, formed with a gradient refraction index micro lens and ~~a fiber optic~~ an optical fiber with cross-sections 941, 942.

Page 8, amend paragraph [0031] as:

[0031] The lens fiber is formed by fusing a micro lens with ~~a fiber optic~~ an optical fiber. Alternatively, a lens fiber is also formed by treating the tip of ~~a fiber optic~~ an optical fiber so that it can act as a lens. A lens fiber can be classified as conic lens, ball

lens, aspheric lens, plano-convex, or thermal expanded core fiber. The cross sections 951, 952 of a thermal expanded core fiber are shown in figure 9E.